

ABSTRACT OF THE DISCLOSURE

A process kit is described that resists plasma erosion, preserves the spatial uniformity of plasma properties, reduces particle generation in the chamber, and significantly enhances the lifetime of the process kit. A layer of polymer material covers the top surface of the process kit. The polymer material is fluorocarbon-based and not reactive with the species in the plasma. The polymer material not only protects the process kit from progressive erosion, but also prevents the generation of particles in the chamber. The polymer material has similar permittivity to that of the process kit and therefore maintains the spatial uniformity of plasma properties, e.g., etch rate, near the wafer perimeter. The thickness of the layer is controlled between 0.5 and 1.5 mm such that the difference between its coefficient of thermal expansion and that of the process kit will not cause the layer to peel off the process kit's top surface.